

## CHAPTER CONTENTS

**Multi-Lab**  
**Energy Transformations in Springs** **183**

**5.1 Work and the Transformation of Energy** **184**

**Investigation 5-A**  
**Testing the Law of Conservation of Energy** **197**

**5.2 Hooke's Law and Periodic Motion** **201**

**Investigation 5-B**  
**Testing Hooke's Law** **202**

**Investigation 5-C**  
**Analyzing Periodic Motion** **209**

**Investigation 5-D**  
**Another Test of the Law of Conservation of Energy** **211**

**5.3 Energy Transformations** **213**

**Investigation 5-E**  
**Mechanical and Thermal Energy** **221**



## PREREQUISITE CONCEPTS AND SKILLS

- Concept of work
- Kinetic energy
- Potential energy
- Thermal energy and heat

**W**ith a “whump,” the fireworks shell is lofted upward into the darkness. As the shell rises, it slows; kinetic energy transforms into gravitational potential energy. Then, the shell explodes and chemical potential energy rapidly converts into heat, light, and sound. The darkness gives way to brilliant colour and loud bangs startle the crowd below.

There is a balance in all of these transformations and effects. Energy gained in one form comes at the expense of another. This is the law of conservation of energy.

In this chapter, you will examine these energy transformations and balances and investigate a few of their applications.